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ABSTRACT

Eleven mathematics objectives for seventh grade students to attain are listed. After general specifications for test items and the format for the test package are noted, specifications for assessing each objective are given, with enabling skills, a description of test questions, a description of answer choices, and examples of test questions for each objective. Objectives concern operations with fractions and decimals, problem solving with two-step word problems, geometric terms and figures, perimeter, measurement, use of charts and graphs, one-step equations, and possible outcomes. (MNS)

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Mathematics Objectives and Measurement Specifications 1986 Grade 7

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Texas Educational Assessment of Minimum Skills

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Division of Educational Assessment
Texas Education Agency
Austin, Texas

Foreword

The learning objectives contained in this volume are congruent with the *State Board of Education Rules for Curriculum* which outlines the rules and procedures for implementation of Section 21.101 of the Texas Education Code. These objectives and the measurement specifications are provided for use by teachers and other educators responsible for pupil instruction and for test development specialists involved with the preparation of the Texas Educational Assessment of Minimum Skills (TEAMS) tests. Beginning with the 1985-86 school year, the TEAMS tests will be based upon the objectives in this publication.

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Commissioner of Education

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Mathematics

List of Objectives

Grade 7

Objective 1: Add and subtract fractions with like or unlike denominators.
Objective 2: Add, subtract, and multiply decimals.
Objective 3: Solve two-step word problems using the basic operations with whole numbers.
Objective 4: Solve two-step word problems using addition, subtraction, and multiplication with decimals.
Objective 5: Convert decimals or percents to equivalent forms.
Objective 6: Identify common geometric terms and figures.
Objective 7: Find the perimeter of polygons.
Objective 8: Convert measurements within either the metric or customary system of measurement.
Objective 9: Use information from charts or graphs to solve word problems.
Objective 10: Solve one-step equations.
Objective 11: Determine the number of possible outcomes for a given situation.

Grade 7 Mathematics

General Specifications

I. Test Items

A. All written material, including instructions, item stems, solutions, and answer choices, shall have vocabulary drawn from the Texas Education Agency (TEA) cumulative vocabulary list for Grade 6.

B. Word problems shall represent various ethnic groups of populations in Texas. The three main groups are black, Hispanic, and white.

C. Word problems shall be free of stereotyping by age, sex, ethnicity, and geographical location.

D. No negative numbers shall be used in test items.

E. For each item, there shall be four responses with only one correct response.

F. Where feasible, at least one incorrect answer choice per item shall be sufficiently close to the correct answer that identification of the correct answer is unlikely by estimation.

G. In items with numerical answer choices, no negative answer choices shall be used.

H. Neither "none of the above" nor "all of the above" shall be used as an answer choice.

I. Problem situations shall be appropriate for seventh grade students.

J. All fractions shall be written in vertical form.

K. Money problems shall be written using decimal notation.

II. Format for Test Package

A. Graphics, their corresponding items, and response choices shall appear on the same or facing pages.

B. Type size shall be appropriate for seventh grade students.

C. The test shall be printed in black ink on white paper.

Grade 7 Mathematics

Objectives and Measurement Specifications

Objective 1
Add and subtract fractions with like or unlike denominators.

Enabling Skills

1. Modeling addition and subtraction of fractions
2. Expressing a fraction in an equivalent fractional form

Description of Test Questions

1. Fractions shall not exceed 1.
2. Least common denominators of fractions shall not exceed 16.
3. Operational signs (+,-) rather than words shall be used to indicate the operation to be performed.
4. Addition problems shall present only two addends whose sum is less than 1.
5. One problem shall involve addition with like denominators.
6. One problem shall require reduction.
7. Both horizontal and vertical problem formats may be used.

Description of Answer Choices

1. All answer choices shall be written in lowest terms.
2. The correct answer will be the exact solution to the addition or subtraction problem presented.
3. Incorrect answer choices will be the result of common errors made when adding or subtracting fractions.

Examples of Test Questions

(a) Solve the problem. Express your answer in lowest terms.

$\frac{2}{7} + \frac{4}{7} =$ _____

A $\frac{6}{7}$

B $\frac{9}{11}$

C $\frac{3}{7}$

D $\frac{11}{9}$

(b) Solve the problem. Express your answer in lowest terms.

$$\begin{array}{r} \frac{2}{3} \\ -\ \frac{1}{4} \\ \hline \end{array}$$

A $\frac{5}{12}$

B $\frac{2}{7}$

C $\frac{5}{7}$

D $\frac{1}{12}$

Objective 2
Add, subtract, and multiply decimals.

Enabling Skills

1. Applying decimal place value concepts
2. Using addition algorithms
3. Using subtraction algorithms
4. Using multiplication algorithms

Description of Test Questions

1. Addition and subtraction problems shall be displayed horizontally.
2. Multiplication problems shall be displayed in both horizontal and vertical formats.
3. Addition problems shall have no more than three addends.
4. For addition and subtraction problems, the maximum number of digits in any one number shall be five, with no more than three of these to the right of the decimal point.
5. Numbers to be added or subtracted shall have different numbers of places to the right of the decimal point.
6. One addition or subtraction problem shall include a whole number.
7. Multiplication problems shall be limited to two factors.
8. Factors used in multiplication problems shall not exceed three digits.
9. No more than one three-digit factor shall be used in a multiplication problem.
10. There shall be at least one addition, subtraction, and multiplication item.

Description of Answer Choices

1. The correct answer will be the exact solution to the addition, subtraction, or multiplication problem presented.
2. Incorrect answer choices shall represent common errors in computation and decimal placement.

Examples of Test Questions

(a) Solve the problem.

$7.35 + 14.208 + 138.6 =$

A 160.158

B 160.23

C 163.29

D 159.158

(b) Solve the problem.

$162.38 - 17.841 =$

A 144.539

B 16.03

C 144.439

D 155.541

(c) Solve the problem.

$6.92 \times 5 =$

A 34.6

B 30.92

C 30.46

D 39.2

Objective 3
Solve two-step word problems using the basic operations with whole numbers.

Enabling Skills

1. Using appropriate vocabulary
2. Using basic operations
3. Reading for understanding

Description of Test Questions

1. All whole numbers shall be less than 1000.
2. Extraneous information shall be given in at least one test question. Extraneous information shall be written in numerical form.
3. All problems shall require the use of two computations.
4. The numbers used in computation shall be written in numerical form.
5. Division problems shall not yield remainders.
6. Money shall not be used.

Description of Answer Choices

1. All answer choices shall be appropriately labeled whole numbers.
2. The correct answer will be the exact solution to the word problem presented.
3. Incorrect answer choices shall reflect common errors in problem-solving (e.g., wrong choice of operations or wrong order of operations) as well as common errors in computation.

Examples of Test Questions

(a) A truck delivers 40 crates of peaches to the grocery store. Each crate contains 12 boxes of peaches. Each box contains 24 peaches. How many peaches are in the 40 crates?

A 11,520 peaches

B 972 peaches

C 288 peaches

D 10,480 peaches

(b) On her vacation, Mary used 3 complete rolls of camera film with 24 pictures each. Of the pictures she took, 6 pictures did not turn out well. How many good pictures did she have?

A 66 pictures

B 72 pictures

C 78 pictures

D 54 pictures

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Objective 4
Solve two-step word problems using addition, subtraction, and multiplication with decimals.

Enabling Skills

1. Using appropriate vocabulary
2. Using basic operations
3. Reading for understanding

Description of Test Questions

1. All problems shall require the use of two computations.
2. The numbers used in computation shall be written in numerical form.
3. The maximum number of digits in any one number shall be four, with no more than three of these to the right of the decimal point.
4. The total number of digits in the factors of any multiplication problem shall not exceed five (3 digits × 2 digits or 4 digits × 1 digit).
5. At least one problem shall involve money.
6. No extraneous data shall be used in item stems.

Description of Answer Choices

1. All answer choices shall be appropriately labeled.
2. The correct answer choice will be the exact solution to the word problem presented.
3. Incorrect answer choices shall reflect common errors in problem-solving (e.g., wrong choice of operations or wrong order of operations) as well as common errors in computation.

Example of Test Questions

At a track meet Les ran three races. The first race he ran in 11.21 seconds, the second in 23.5 seconds, and the third in 53.27 seconds. The school record for the total time for these three races is 86.03 seconds. What is the difference in Les' total time and the school record?

A 1.95 seconds

B 1.50 seconds

C 174.01 seconds

D 612.02 seconds

Objective 5
Convert decimals or percents to equivalent forms.

Enabling Skills

1. Writing equivalent forms of fractions

Description of Test Questions

1. No fractions shall be included in test questions.
2. Decimals shall be limited to tenths or hundredths.
3. Percents shall be limited to whole numbers.
4. One item shall pertain to each of the following:
   a. given a decimal, identify the equivalent fraction
   b. given a decimal, identify the equivalent percent
   c. given a percent, identify the equivalent decimal
   d. given a percent, identify the equivalent fraction

Description of Answer Choices

1. The correct answer shall be the exact solution to the problem presented.
2. Incorrect decimal answer choices shall include only misplaced decimals.
3. Answer choices shall not include fractions which are equivalent to each other.
4. Fractional answer choices shall not be reduced.
5. Decimal answer choices shall be expressed in tenths or hundredths.

Examples of Test Questions

(a) Change 0.25 to a fraction.

A $\frac{25}{100}$

B $\frac{2}{5}$

C $\frac{1}{25}$

D $\frac{1}{2}$

(b) Change 0.55 to a percent.

A 55%

B 5.5%

C 5%

D 20%

(c) Change 46% to a decimal.

A 0.46

B 4.6

C 4.06

D 46

(d) Change 50% to a fraction.

A $\frac{50}{100}$

B $\frac{1}{5}$

C $\frac{5}{100}$

D $\frac{1}{50}$

Objective 6
Identify common geometric terms and figures.

Enabling Skills

1. Using geometric vocabulary
2. Identifying geometric figures
3. Describing geometric figures
4. Identifying right angles

Description of Test Questions

1. Terms to be tested shall be taken from the list below:
   a. Types of lines:
      intersecting lines
      perpendicular lines
      parallel lines
   b. Parts of a circle:
      radius
      diameter
      circumference
   c. Types of polygons:
      trapezoid
      parallelogram
      pentagon
      hexagon
      octagon
2. Questions may present a figure and ask for the appropriate term or present the term and ask for the appropriate figure.
3. Arrows shall be drawn at the ends of all lines.
4. All trapezoids shown shall be isosceles.
5. All parallelograms shown shall not have right angles.
6. All polygons shown shall be regular.
7. There shall be at least one problem representing each group of terms listed above.
8. Circles shall have center dots.

Description of Answer Choices

1. All answer choices shall be drawn from the list of terms above.
2. The correct answer shall be the term naming the figure presented or the figure representing the term presented.
3. Incorrect answer choices shall be a term or figure other than the one called for by the item.
4. When a test item presents a figure and asks for the appropriate term, all answer choices will fit grammatically into the item stem.

Examples of Test Questions

(a) The figure below is a picture of

A parallel lines

B perpendicular lines

C a trapezoid

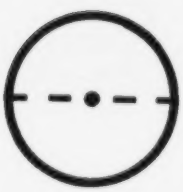
D a diameter

(b) Which figure shows a trapezoid?

A

B

C

D 

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Objective 7
Find the perimeter of polygons.

Enabling Skills

1. Using the concept of perimeter
2. Using formulas for perimeter
3. Using basic computation

Description of Test Questions

1. All polygons shall be labeled with the minimum number of dimensions necessary to determine the perimeter.
2. Regular polygons shall be identified as such.
3. Dimensions shall be limited to whole numbers and shall be labeled. (Abbreviations for customary units shall be followed by periods.)
4. No formulas shall be given.

Description of Answer Choices

1. All answer choices shall be appropriately labeled whole numbers.
2. The correct answer will be the exact solution to the perimeter problem presented.
3. Incorrect answer choices will reflect a misunderstanding of the concept of perimeter as well as common computation errors.

Examples of Test Questions

(a) What is the perimeter of the rectangle below?

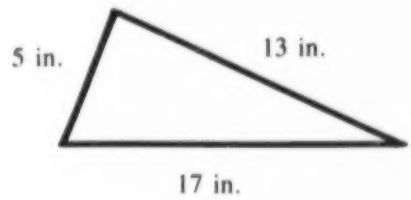
A 38 cm

B 19 cm

C 88 cm

D 3 cm

(b) What is the perimeter of the triangle below?



A 35 in.

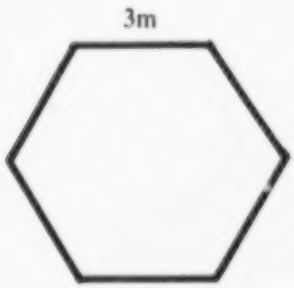
B 25 in.

C 6 in.

D 30 in.

24

(c) What is the perimeter of the regular polygon below?



A 18 m

B 12 m

C 9 m

D 27 m

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Objective 8
Convert measurements within either the metric or customary system of measurement.

Enabling Skills

1. Identifying metric and customary units of measurement
2. Using multiplication and division of whole numbers and decimals

Description of Test Questions

1. Measurement units that may be used are:

   Metric: millimeter, centimeter, meter, kilometer
   milligram, gram, kilogram
   milliliter, liter, kiloliter

   Customary: inch, foot, yard, mile
   ounce, pound, ton
   cup, pint, quart, gallon

2. Two problems shall involve the use of metric units, and two shall involve the use of customary units.
3. No conversion between metric and customary units shall be required by an item.
4. There shall be at least one item for each of:
   a. weight/mass
   b. length
   c. capacity/volume
5. A statement of equivalence will be given for each problem listing the smaller unit first (e.g., 100 centimeters = 1 meter).
6. Problems shall involve conversions commonly used.
7. Quantities to be converted shall be expressed as whole numbers or decimals.
8. Quantities expressed using the smaller unit in a statement of equivalence shall not exceed 4 digits.
9. No abbreviations shall be used in problems.

Description of Answer Choices

1. The correct answer will be the exact solution to the conversion problem presented.
2. Incorrect answer choices shall reflect common errors in problem-solving (e.g., using the incorrect operation) as well as common errors in conversion.
3. All answer choices shall be expressed as whole numbers or decimals.

Examples of Test Questions

(a) 6 feet = _____ inches (12 inches = 1 foot).

A 72

B $\frac{1}{2}$

C 18

D 62

(b) 690 centimeters = _____ meters (100 centimeters = 1 meter).

A 6.9

B 6900

C 69

D 0.69

Objective 9
Use information from charts or graphs to solve word problems.

Enabling Skills

1. Reading and interpreting data from charts and graphs

Description of Test Questions

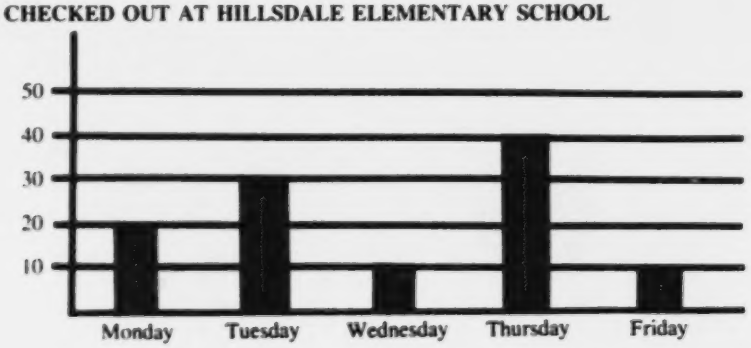
1. Types of graphs shall include bar, line, and picture graphs.
2. Values on numerically labeled axes of graphs will be expressed in whole numbers using intervals greater than one.
3. Data points on bar and line graphs will not require interpolation between labeled intervals.
4. Graphs shall display no more than eight "pieces" of data.
5. Only one operation shall be required.
6. Bar graphs shall include horizontal lines.
7. Line graphs shall include a grid of both horizontal and vertical lines.
8. Line graphs shall include large dots at data points.

Description of Answer Choices

1. Answer choices shall be appropriately labeled.
2. The correct answer choice will be the exact solution to the word problem presented.
3. Incorrect answer choices shall reflect the use of incorrect operations as well as the use of incorrect data.

Example of Test Questions

LIBRARY BOOKS CHECKED OUT AT HILLSDALE ELEMENTARY SCHOOL



How did the number of books checked out on Tuesday differ from the number of books checked out on Monday?

A 10 books more on Tuesday
B 20 books less on Tuesday
C 10 books less on Tuesday
D 30 books more on Tuesday

—7—

Objective 10
Solve one-step equations.

Enabling Skills

1. Using basic computation skills
2. Using basic properties of equality
3. Using inverse operations

Description of Test Questions

1. Equations shall involve only whole numbers, with a maximum of two digits.
2. Equations shall be limited to one operation.
3. The variable shall appear on the left side of the equal sign.
4. The variable shall be represented as "n."
5. The equation shall be written like one of the three forms below:

   $n - 4 = 6$
   $n + 12 = 19$
   $3n = 18$

Description of Answer Choices

1. Answer choices shall be "n = (whole number)."
2. The correct answer shall be the exact solution for "n" in the given equation.
3. Incorrect answer choices shall reflect incorrect procedures for solving equations, as well as computation errors.

Example of Test Questions

Solve $n - 8 = 32$ for n.

A $n = 40$
B $n = 24$
C $n = 256$
D $n = 4$

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Objective 11
Determine the number of possible outcomes for a given situation.

Enabling Skills

1. Listing the possible outcomes in a given situation

Description of Test Questions

1. Items shall not include dice, cards, coins, or other gambling devices.
2. Problem situations shall involve clearly differentiated objects, not dependent on order.
3. The number of possible outcomes shall not exceed 24.

Description of Answer Choices

1. All answer choices shall be appropriately labeled whole numbers.
2. The correct answer choice will be the exact number of possible outcomes for the given situation.
3. Incorrect answer choices shall reflect both use of incorrect operations as well as computation errors.

Example of Test Questions

Bill has three different pairs of slacks and four different shirts. How many different combinations of shirts and slacks can he make?

A 12 combinations

B 7 combinations

C 4 combinations

D 8 combinations

COMPLIANCE STATEMENT

TITLE VI, CIVIL RIGHTS ACT OF 1964; THE MODIFIED COURT ORDER, CIVIL ACTION 5281, FEDERAL DISTRICT COURT, EASTERN DISTRICT OF TEXAS, TYLER DIVISION

Reviews of local education agencies pertaining to compliance with Title VI Civil Rights Act of 1964 and with specific requirements of the Modified Court Order, Civil Action No. 5281, Federal District Court, Eastern District of Texas, Tyler Division are conducted periodically by staff representatives of the Texas Education Agency. These reviews cover at least the following policies and practices:

(1) acceptance policies on student transfers from other school districts;

(2) operation of school bus routes or runs on a non-segregated basis;

(3) nondiscrimination in extracurricular activities and the use of school facilities;

(4) nondiscriminatory practices in the hiring, assigning, promoting, paying, demoting, reassigning, or dismissing of faculty and staff members who work with children;

(5) enrollment and assignment of students without discrimination on the basis of race, color, or national origin;

(6) nondiscriminatory practices relating to the use of a student's first language; and

(7) evidence of published procedures for hearing complaints and grievances.

In addition to conducting reviews, the Texas Education Agency staff representatives check complaints of discrimination made by a citizen or citizens residing in a school district where it is alleged discriminatory practices have occurred or are occurring.

Where a violation of Title VI of the Civil Rights Act is found, the findings are reported to the Office for Civil Rights, Department of Health, Education and Welfare.

If there is a direct violation of the Court Order in Civil Action No. 5281 that cannot be cleared through negotiation, the sanctions required by the Court Order are applied.

TITLE VII, CIVIL RIGHTS ACT OF 1964; EXECUTIVE ORDERS 11246 AND 11375; TITLE IX, 1973 EDUCATION AMENDMENTS; REHABILITATION ACT OF 1973 AS AMENDED; 1974 AMENDMENTS TO THE WAGE-HOUR LAW EXPANDING THE AGE DISCRIMINATION IN EMPLOYMENT ACT OF 1967; AND VIETNAM ERA VETERANS READJUSTMENT ASSISTANCE ACT OF 1972 AS AMENDED IN 1974.

It is the policy of the Texas Education Agency to comply fully with the nondiscrimination provisions of all federal and state laws and regulations by assuring that no person shall be excluded from consideration for recruitment, selection, appointment, training, promotion, retention, or any other personnel action, or be denied any benefits or participation in any programs or activities which it operates on the grounds of race, religion, color, national origin, sex, handicap, age, or veteran status (except where age, sex, or handicap constitute a bona fide occupational qualification necessary to proper and efficient administration). The Texas Education Agency makes positive efforts to employ and advance in employment all protected groups.

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